

Calytrix gomphrenoides (Myrtaceae), a new species from the Kimberley Region of Western Australia

Matthew D. Barrett¹, Lyn A. Craven² and Russell L. Barrett^{1,3}

¹Botanic Gardens and Parks Authority, Fraser Ave, West Perth, Western Australia 6005 and School of Plant Biology, Faculty of Natural and Agricultural Science, University of Western Australia, Crawley, Western Australia 6009

²Australian National Herbarium, CPBR, CSIRO Plant Industry, GPO Box 1600, Canberra, Australian Capital Territory 2601

³c/- Western Australian Herbarium, Department of Environment and Conservation, Locked Bag 104, Bentley Delivery Centre, Western Australia 6983

Abstract

Barrett, M.D., Craven, L.A. & Barrett, R.L. *Calytrix gomphrenoides* (Myrtaceae), a new species from the Kimberley Region of Western Australia. *Nuytsia* 19(1): 1–8 (2009). *Calytrix gomphrenoides* M.D.Barrett & Craven is described as a new species from sandstone pavements of the north-west Kimberley Region of Western Australia. It is apparently most closely related to *C. inopinata* Craven in the *C. exstipulata* DC. alliance. Emendations to a published key and notes on related species are provided.

Introduction

Calytrix Labill. (Myrtaceae: Chamelaucieae) was revised by Craven (1987). Since then four species and two subspecies have been added to the genus from south-west Western Australia (Craven 1990, Keighery 2004) and one from the Northern Territory (Craven 1991). During a recent field trip to the remote Prince Regent River area, one of us (MDB) found an unusual long-hypanthiate *Calytrix* that differed in several respects from *C. exstipulata* DC., the only known Kimberley species with a long hypanthium. On examination, the taxon proved sufficiently distinct to warrant specific recognition, and is here described as a new species. Subsequent searches have discovered several additional populations, and examination of herbarium material revealed one earlier collection from 1997. *Calytrix gomphrenoides* is restricted to treeless sand flats over sandstone, as are many other localised microphyllous Myrtaceae in sandstone areas of north-western Australia such as *Calytrix megaphylla* (F. Muell.) Benth., *C. micrairoides* Craven, *Petraeomyrtus punicea* (Byrnes) Craven, and *Thryptomene remota* A.R.Bean (Bean 1997; Craven 1980, 1987, 1990, 1991, 1999). Many new taxa have been discovered in the Kimberley in similar habitats in recent years, with species recently described in *Acacia* (Lewington & Maslin 2009), *Bossiaea* (Ross 2006) and *Micraira* (Barrett & Barrett 2005), and with additional taxa from many genera in preparation by a number of authors.

Methods

All measurements and illustrations were made from dried material. Descriptive terminology follows Craven (1987). The distribution map was created in DIVA-GIS Version 5.2.0.2. (<http://www.diva-gis.org>) using coordinate data from personal collections, and show *Interim Biogeographic Regionalisation for Australia (IBRA) Version 6.1* boundaries (Department of the Environment, Water, Heritage and the Arts 2008).

The new species is numbered to facilitate placement in the revision of *Calytrix* (Craven 1987, 1990, 1991).

Taxonomy

29B. *Calytrix gomphrenoides* M.D.Barrett & Craven, *sp. nov.*

Frutex multicaulis lignotuberosus usque 50 cm altus. Folia caulis (2–)4–10 mm longa, linearia, sectione transversali obtriangularia. Folia floralia alis membranaceis partim usque perfecte. Flores in fasciculis terminalibus. Bracteolae membranaceae, carinis laciniatis, jam liberae et discretim deciduae. Hypanthium glabrum, 10-costatum, a stylo discretum paene omnino, 9–13 mm longum. Petala alba erubescens adaxialiter. Stamina 16–18, 1-seriata.

Typus: Near falls on south arm of Bachsten Creek, Kimberley Region, 15° 58' 00" S, 125° 19' 30" E, Western Australia, 31 January 1999, M.D. Barrett 692 (*holo*: PERTH 06359728, *iso*: CANB, MEL, DNA, K, BRI, NSW).

Multi-stemmed lignotuberosus *shrub* to 50 cm tall, glabrous; apices of stems usually not continuing growth (growth continuing from below flowering head), sometimes continuing from apices. *Bud scales* absent. *Leaves* alternate, sparse on main stems becoming dense toward apices of short branches, appressed to ascending on stems, ascending to spreading on branches, sometimes deciduous on main stems; *stipules* to 0.25 mm long; *petiole* 0.9–1.2 mm long; *stem leaves*: blade linear, glabrous, (2–)4–10 mm long, 0.4–0.8 mm wide, straight, broadly obtriangular in transverse section, margin entire, base slightly narrowing to petiole, apex acute and mucronulate, with a row of oil-glands on each side of midrib abaxially and adaxially; *floral leaves* 6–8 mm long, 1.0–1.6 mm wide, with a pale membranous wing 0.3–0.6 mm wide on each side along basal half to entire length of leaf, otherwise as for stem leaves. *Inflorescences* many, in dense terminal heads of 15–40 flowers. *Peduncle* c. 0.3 mm long, apex slightly extending, with enations on the inner edge. *Bracteoles* chartaceous, almost completely free, connate in proximal c. 1 mm, deciduous after anthesis and falling separately, narrowly obovate, body 6.5–8.0 mm long, 2.2–2.4 mm wide, straight, distal half with a strong, lacinate keel, bordered either side by a row of translucent glands, margin erose near the subacute apex and with an apiculum 1.4–2.2 mm long. *Hypanthium* 10-ribbed, almost completely free from the style, 9–13 mm long, cylindrical (slightly swollen in the ovary region) and tapering toward the base, ovary region c. 0.6 mm wide and terete in section, free region 4–6 mm long, c. 0.6 mm wide, slightly flared at the apex to 0.8 mm wide; *staminal disc* produced inward, the inner edge sometimes producing a collar. *Calyx segments* connate at the base (for up to 0.7 mm); body suborbicular to ovate (excluding awn), 1.7–2.5 mm long, 2.0–2.5 mm wide, margin erose, apex acute; awn 11–12 mm long; minutely scabrid, curled in bud. *Petals* narrowly ovate, 5.5–7.2 mm long, 1.7–1.9 mm wide, apex acute, with sparse embedded translucent glands, adaxially white soon becoming pink, the basal region becoming dark red

after anthesis, abaxially suffused pink around reddish veins and with broad white margins, sometimes drying yellow. *Stamens* 16–18, 1-seriate; filaments white becoming pink then dark red, 3.5–9 mm long, of varying lengths in single flower; *anthers* all fertile, 0.25–0.40 mm long, the connective prominent, with 4 gibbous glands on abaxial face. *Style* persistent, exerted for 5–6.5 mm; *stigma* minute, narrower than style, minutely papillate. *Mature seed* *c.* 4 × 0.8 mm, very narrowly obovoid. (Figures 1, 2)



Figure 1. A–F. *Calytrix gomphrenoides*. A – habit; B – leafy stem; C – flowering stem; D – floral leaf; E – pair of bracteoles; F – flower. All from M.D. Barrett 433 (PERTH). Drawn by Sharyn Wragg. All scale bars = 1 cm.

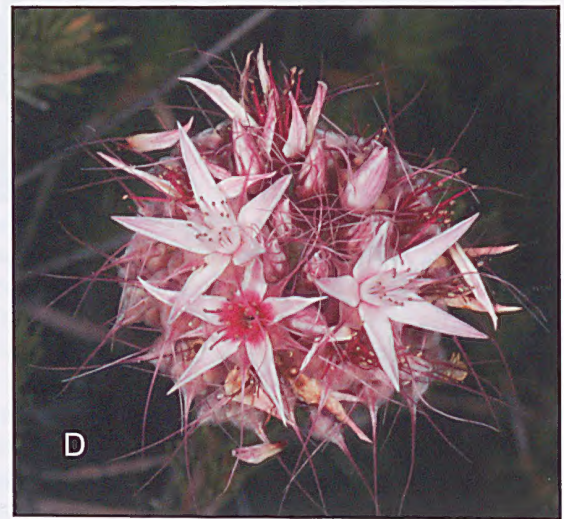
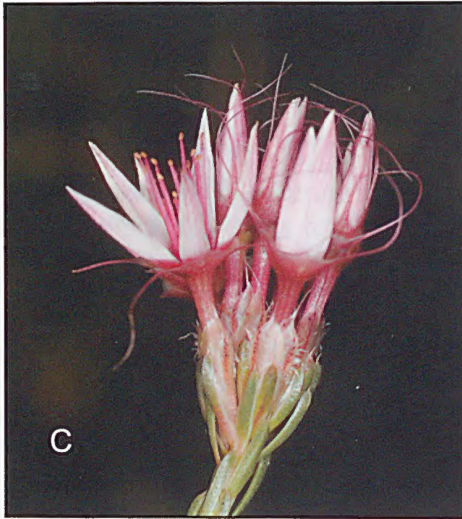


Figure 2. A–D. *Calytrix gomphrenoides*. A – sandstone pavement habitat with plants on foreground (R.L. Barrett & M.D. Barrett RLB 3864); B – habit with *Borya subulata*; C – flowering stem; D – flower cluster; B–D from R.L. Barrett & M.D. Barrett RLB 3774, both at PERTH.

Other specimens examined. WESTERN AUSTRALIA: [precise localities withheld for conservation reasons] Gardner Region: Mt Bomford, 19 Mar. 1999, *M.D. Barrett* 433 (CANB; PERTH); north arm of Bachsten Creek Gorge, 30 Jan. 1999, *M.D. Barrett* 684 (PERTH); north arm of Bachsten Creek Gorge, 3 Feb. 1999, *M.D. Barrett* 740B (PERTH); Mt Bomford, 25 Jan. 2000, *M.D. Barrett* 876 (CANB, DNA, PERTH); N of Kings Cascade, Prince Regent Nature Reserve, 20 Jan. 2003, *M.D. Barrett & R.L. Barrett* 1348 (PERTH); ESE of Mt Agnes, 21 Jan. 2003, *M.D. Barrett & R.L. Barrett* 1359 (AD, PERTH); south arm of Bachsten Creek, 23 Jan. 2007, *R.L. Barrett & M.D. Barrett* RLB 3774 (DNA, MEL, NSW, PERTH); near Youwanjela Creek, 25 Jan. 2007, *R.L. Barrett & M.D. Barrett* RLB 3864 (DNA, NSW, PERTH); E of Mt Trafalgar, Prince Regent Nature Reserve, 25 Jan. 2007, *R.L. Barrett & M.D. Barrett* RLB 3953 (CANB, PERTH); Mt Bomford, 13 May 1997, *S.D. Hopper* 8346 (PERTH).

Distribution. Known only from ranges around the Prince Regent River, north-west Kimberley Region, Western Australia (Figure 3), where it occurs in relatively few localised populations. Extensive and widespread but by no means exhaustive surveys of pavements in the NW Kimberley have been made by MDB & RLB. From these surveys we estimate that the distributional extent of *C. gomphrenoides* is probably fairly accurate, and that we have found perhaps half of the total populations. All but one of the collections to date have been made using a helicopter for field access.

Habitat. *Calytrix gomphrenoides* has only been found growing in shallow sand over elevated sandstone pavements, in association with *Acacia barrettiorum*, *A. kelleri*, *A. retinervis*, *A. cf. translucens*, *A. vincentii*, *Borya subulata*, *Cochlospermum fraseri*, *Drosera paradoxa*, *D. aff. paradoxa*, *Eriachne ciliata*, *Eriocaulon* sp., *Goodenia arachnoidea*, *G. aff. gloeophylla*, *G. psammophila*, *Heliotropium* spp., *Hibiscus superba*, *Lechenaultia filiformis*, *Micraira brevis*, *M. lazaridis*, *Portulaca* spp., *Rhynchospora* sp., *Sauropus* sp., *Solanum petraeum*, *Sowerbaea alliacea* and *Triodia* spp.

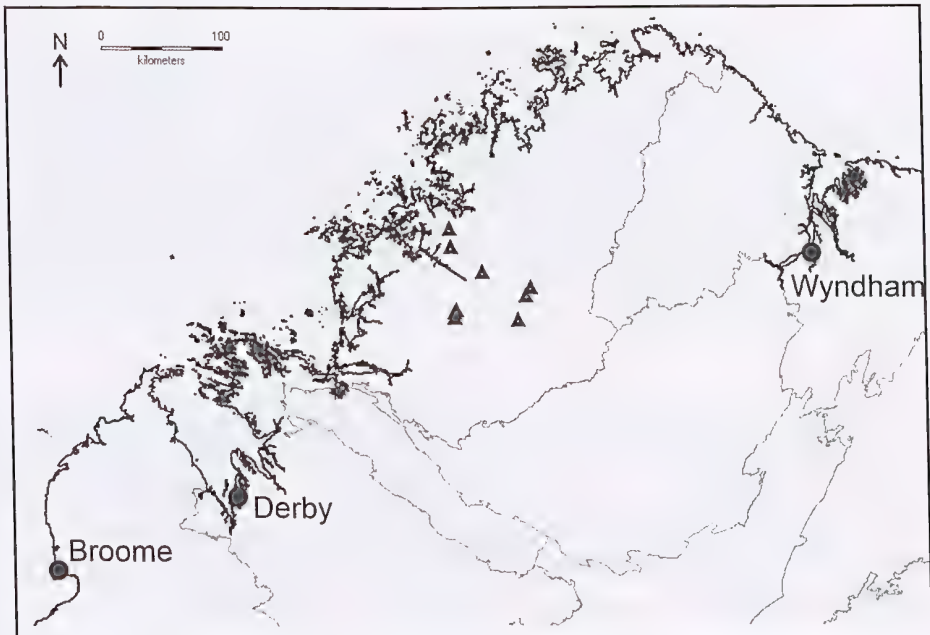


Figure 3. Distribution of *Calytrix gomphrenoides* (▲) in the Kimberley region of Western Australia.

Phenology. Flowering January to May.

Conservation status. Department of Environment and Conservation (DEC) Conservation Codes for Western Australian Flora: Priority Four. Potential habitats are considered to have been adequately surveyed. The species is not under any immediate threat, but is only known from about ten populations. Several populations are estimated to contain over 1000 plants. The species is conserved in the Prince Regent Nature Reserve.

Plants have a lignotuber and are capable of resprouting after fire. The vegetation on the pavements is often too sparse to carry a hot fire, so fire appears to pose little immediate threat to known populations. Fire may, however, have shaped the current restricted distribution pattern of this species and frequent fires may have a detrimental effect on small populations.

Etymology. The specific epithet '*gomphrenoides*' refers to the superficial similarity to *Gomphrena canescens* R.Br. (Amaranthaceae), in particular the multi-stemmed habit with terminal, hemispherical clusters of pink flowers. In addition, the membranous-winged floral leaves and chartaceous bracteoles have a superficial similarity to the translucent bracts and bracteoles of *Gomphrena*.

Affinities. Following the informal species groupings proposed by Craven (1987), the 1-seriate stamens, absence of bud scales and long hypanthium place this species in the *C. decandra* group. However, the similarity between *C. surdiviperana* Craven and *C. inopinata* Craven with 2–several-seriate and 1-seriate stamens respectively suggests that the number of stamen series is not entirely satisfactory to delimit the *C. decandra* group from the *C. exstipulata* group, both of which are in the *C. exstipulata* alliance (see Craven 1991). Craven (1991) accordingly suggested an intermediate position between the two groups for *C. surdiviperana* and *C. inopinata*. *C. gomphrenoides* appears to be a further intermediate species.

Within the *C. exstipulata* alliance, *C. gomphrenoides* appears to be related to a group of species restricted to sandstone pavements or crevices on sandstone in north-west Australia. This group has free bracteoles, longer leaves (compared with *C. exstipulata*), and stipules present and consists of *C. surdiviperana*, *C. inopinata*, *C. mimiana* Craven and *C. megaphylla* (F. Muell.) Benth. The new species differs from these four species in having lacinate keels on the bracteoles, membranous-winged floral leaves, and the apices of stems usually not continuing growth. It also differs from the first two in having a glabrous (vs. pubescent) hypanthium and having shorter stipules and from all except *C. inopinata* in having 1-seriate (vs. (1-)2-3-(4-)seriate) stamens and flowers which are white fading pink (vs. pink fading darker). The petal colour and 1-seriate stamens suggest *C. inopinata* may be the closest relative of *C. gomphrenoides*.

The new species can be distinguished from all other northern *Calytrix* species (except some specimens of *C. carinata* Craven) by the ± free bracteoles with a strong lacinate keel, and further (except *C. inopinata*) by the 1-seriate stamens (partly 1-seriate in some species). The only sympatric species with a long hypanthium is *C. exstipulata*, which differs in lacking stipules, having shorter leaves, and bracteoles fused into a cheiridium with a weaker, entire keel. The habit (low multi-stemmed shrub, resprouting from a lignotuber) is unique in northern species, although the resprouting habit is also a feature of *C. megaphylla*.

Notable features are the habit (multi-stemmed, resprouting from a lignotuber), stem apices not continuing growth, 1-seriate stamens, lacinate-keeled free bracteoles, petals white, fading pink, and the winged floral leaves.

Calytrix gomphrenoides keys out in Key 2 in Craven (1987) amongst *C. decandra*, *C. verruculosa*, and *C. fraseri*. The following should be inserted after the second lead in couplet 9:

9. Stipules not prominent, less than 0.75 mm long, usually 1-paired (sometimes 2-paired in floral leaves).
 9A. Bracteole with a laciniate keel. Apices of flowering stems usually not continuing growth. Floral leaves with a membranous wing, different to stem leaves. **29B. *C. gomphrenoides***
 9A. Bracteole smooth or ridged apically, not laciniate. Apices of flowering stems continuing growth. Floral leaves not winged, undifferentiated from stem leaves.

Notes. *Calytrix gomphrenoides* resprouts after fire with numerous burnt stems having been observed at the base of live plants. The lignotuber extends to 10 cm below ground level and terminates at ground level. The lignotuber may be branched at its base into several units, which may eventually separate. Each unit is *c.* 8 cm long by 2 cm diameter (up to 10 × 5 cm), with epicormic buds along its entire length. Growing stems are 2–10 from each lignotuber unit, mostly from the apex. Each ramet has a primary root at the base of the lignotuber; the root is tapering, twisted, lacking epicormic buds, and is strongly demarcated from the thickened lignotuber. These primary roots may represent taproots, but grow laterally, possibly constrained by sandstone bedrock. Secondary laterals are thin and isodiametric.

Calytrix exstipulata co-occurs with *C. gomphrenoides* at the Bachsten Falls (south arm) site, where it is associated with rocks rather than its usual habitat of sand flats (possibly evading fire). Elsewhere in the Kimberley, *C. exstipulata* does occur on sand.

The leaves of the Mt Bomford specimens are shed as they dry on pressed material. Whether the leaves are deciduous *in situ* over the dry season is unknown.

Acknowledgements

Our grateful thanks to Sharyn Wragg for preparing the illustration. The field trips to the Kimberley Region were undertaken with financial support of the Botanic Gardens and Parks Authority. Stephen Hopper generously allowed access to his personal collecting records. Anne and John Koeysers are thanked for permission to access sites on Drysdale River Station. Thanks are due to our various pilots, particularly Butch Maher, for safely transporting MB and RB to these remote sites.

References

- Barrett, M.D. & Barrett, R.L. (2005). *Micraira brevis* and *M. sp. A*. In: *Flora of Australia*. Vol. 44B, pp. xvii, 124, 130, 458. (Australian Biological Resources Study: Canberra.)
 Bean, A.R. (1997). A new species of *Thryptomene* Endl. and a new species of *Ochrosperma* Trudgen (Myrtaceae) from the Northern Territory, Australia. *Austrobaileya* 4: 647–651.
 Craven, L.A. (1980). A review of the genus *Calytrix* Labill. (Myrtaceae) in northern Australia. *Brunonia* 3: 217–246.
 Craven, L.A. (1987). A taxonomic revision of *Calytrix* Labill. (Myrtaceae). *Brunonia* 10: 1–138.
 Craven, L.A. (1990). Three additional species in *Calytrix* (including the reduction of *Calythropsis*), and notes on *Calytrix exstipulata* (Myrtaceae). *Australian Systematic Botany* 3: 719–725.
 Craven, L.A. (1991). A new species of *Calytrix* (Myrtaceae, Chamelauciceae) from northern Australia. *Australian Systematic Botany* 4: 535–537.

- Craven, L.A. (1999). Generic position of *Melaleuca pumicea*: *Petraeomyrtus*, gen. nov. (Myrtaceae). *Australian Systematic Botany* 12: 675–678.
- Department of the Environment, Water, Heritage and the Arts (2008). *Interim Biogeographic Regionalisation for Australia (IBRA), Version 6.1*. <http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/index.html> [accessed Feb. 2008]
- Keighery, G.J. (2004). Taxonomy of the *Calytrix ecalycata* complex (Myrtaceae). *Nuytsia* 15: 261–268.
- Lewington, M.A. & Maslin, B.R. (2009). Three new species of *Acacia* (Leguminosae: Mimosoideae) from the Kimberley Region, Western Australia. *Nuytsia* 19: 63–75.
- Ross, J.H. (2006). A conspectus of the Western Australian *Bossiaea* species (Bossiaceae: Fabaceae). *Muelleria* 23: 15–143.